

REMARKS

This application, as amended herein, maintains claims 50 – 118.

Applicant thanks the Examiner for the indication of allowability of claims 54, 55, 59 - 80, 86, 92, 93 and 95 – 115. However, in view of the amendments and remarks submitted herein, it is respectfully submitted that all of claims 50 - 118 are directed to patentable subject matter.

Claims 50, 53, 56, 58 and 81 – 85 were rejected as obvious over Ganz et al. in view of Hoyes et al. This rejection is respectfully traversed.

First it is noted that the Examiner has relied on Ganz et al. for teachings with respect to mass spectra. However, Ganz et al has nothing whatsoever to do with respect to mass spectrometry. Ganz et al. deals with aperture effects in optical spectra, such as that produced in a polychromator or in a Fourier Transform Infrared Instrument (FTIR). In fact, a word search of Ganz et al. reveals that Ganz et al. do not even mention the word “mass”. Further, the problems of optical spectroscopy are vastly different than those of mass spectrometry. Optical spectroscopy deals with analyzing light associated with a sample. It has nothing whatsoever to do with the complex problems associated with a mass spectrometer of ionizing a sample, separating the ions in accordance with mass to charge ratio, detecting the ions, and determining the abundance of the various species in accordance with mass to charge ratio. It is thus respectfully submitted that Ganz et al. is not a proper reference to use to reject the claims, which are directed to methods and apparatus of mass spectrometry. The Examiner has apparently recognized this in the first full paragraph of page 4 of the Office Action, wherein the Examiner states that Ganz et al. fail to disclose mass spectral peak shape function, specifying mass spectral target peak shape functions within respective mass spectral ranges.

Second, claim 50, as amended herein recites:

obtaining, from a given calibration standard, at least one actual mass spectral peak shape function, specifying mass spectral target peak shape functions within respective mass spectral ranges, and performing a deconvolution operation between the obtained at least one mass spectral peak shape function and the mass spectral target peak shape functions to obtain at least one calibration filter from a result of the deconvolution operation.

Thus, it is at least one actual mass spectral peak shape function that is obtained in Applicant's invention, as recited in claim 50. The Examiner has admitted that Ganz et al. (even if it were relevant, which Applicant disputes) does not disclose mass spectral peak shape function (Office Action, page 4, first full paragraph). The obtaining of at least one actual mass spectral peak shape function is in sharp contrast to Hoyes et al., which teaches away from the use of an actual mass spectral peak shape function. In fact, Hoyes et al. processes data to determine mass centeriods and peak areas, and raw data representing the peak is discarded (column 3, lines 47 –56). An assumed peak-shape function (such as a Gaussian, column 3, line 34), is used for correction (column 3, lines 54 – 56). Thus, it is respectfully submitted that Hoyes adds nothing to the teaching of Ganz et al. that would render applicant's invention, as set forth in claim 50, obvious, even if Ganz et al. were relevant.

As a third reason for why claim 50 is not obvious over Ganz et al. in view of Hoyes et al., it is noted that there is no suggestion to combine the teachings of Ganz et al. and Hoyes et al. As noted above, Ganz et al. deals with optical spectroscopy. There is absolutely no teaching or suggestion in Ganz et al. that its teachings may be used in the field of mass spectrometry. Thus, there is no teaching or suggestion to combine it with Hoyes et al., even if Hoyes et al. were relevant. Further, there is no teaching or suggestion in Hoyes et al. that anything therein may be combined with teachings in the field of optical spectroscopy, as Hoyes et al. does not deal with, or even suggest dealing with optical spectroscopy.

For the three very cogent reasons set forth above, it is respectfully suggested that claim 50 is directed to patentable subject matter. Further, for the same reasons, claims 53, 56, 58 and 81 – 85 are also directed to patentable subject matter.

Claim 51 was rejected as obvious over Ganz et al. in view of Hoyes et al., and further in view of Axelsson. This rejection is respectfully traversed.

Claim 51, as amended herein, states that the at least one mass spectral peak shape function can be obtained from a section of a mass spectrum that contains a single isotope peak with no significant overlaps from other isotope peaks. The cited portions of Axelsson have nothing whatsoever to do with this concept (Col. 3, lines 52 – 67; Col. 5, lines 26 – 64; and col. 10, lines 27 – 38) In fact the last cited portion in column 10 actually teaches away from Applicant's invention in requiring the suppression of major isotopic peaks that may exist in a mass spectrum. Thus, it is respectfully submitted that the rejection of claim 51 should be withdrawn.

Claims 52, 57, 88, 90, 91, 94 and 116 – 118 were rejected as obvious over Ganz et al. in view of Hoyes et al. and Axelsson and further in view of Rather. This rejection is respectfully traversed.

Independent claim 88, as amended herein, recites:

A method for obtaining at least one actual mass spectral peak shape function, comprising the steps of: calculating, for a given calibration standard, relative isotope abundances and theoretical mass locations of isotopes corresponding to the at least one mass spectral peak; performing convolution operations on both calculated relative isotope abundances and said mass spectral peak using a same continuous function with a narrow peak width; and performing a deconvolution operation between the measured isotope peak clusters and calculated isotope peak clusters after said convolution operations to obtain the at least one actual mass spectral peak shape function.

Thus, independent claim 88 is directed to obtaining at least one actual mass spectral peak shape function.

First, Applicant repeats herein all of the reasons stated above for why neither Ganz et al. nor Hoyes et al. render claim 50 obvious, as also being directly applicable to why claim 88 is not obvious. Further, as noted above with respect to claim 50 neither Ganz et al. nor Hoyes et al. is concerned with actual mass spectral peak shape function. Neither Axelsson nor Rather cure the deficiency of Ganz et al. and Hoyes et al. First, the Examiner has admitted that Axelsson does not include actual mass locations, instead relying on Rather (office Action, page 5, last two paragraphs). Second, Rather does not obtain actual peak shape function. In fact, Rather teaches away from Applicant's invention, as set forth in claim 88. In this regard, reference is made to page 4, paragraph 0029, wherein it is stated that:

With this procedure; the peak width of the time-of-flight signals does not become part of the peaks in the composite histogram spectrum (as with histograms by TDCs) but the measured peak intensities are maintained so that the correct isotope distributions are measured even if higher ion currents exist which result in a large number of ions in a peak in a single spectrum.

Further, page 6, paragraph 0047 of Rather states that:

The algorithm should calculate both the position, i.e the time of flight, and the intensity of the peak. The position is best found by a smoothed calculation of the first derivative, where the zero crossover with successively calculated derivative values indicates a maximum (or minimum) value in each case. The direction of the zero crossover indicates whether it is a maximum or minimum. The intensity is calculated by a summation via the main component of the peak.

Finally, paragraph 0065 of Rather, which was specifically relied upon by the Examiner, states:

FIG. 4 shows a measurement curve which has been acquired using the method according to the invention. An ADC with a clock time of 2 MHz was used but an averaged time of flight for the ions of the associated ion signal and an averaged intensity were determined from each individual spectrum. (emphasis added).

Thus, actual peak shape function is not obtained or preserved in the teachings of Rather.

Since it is improper to make the combination in the first place, and even if the combination or references is made, claim 88 is not obvious over the references, it is respectfully submitted that the rejection of claim 88, for which the Examiner must rely on a combination of four unrelated and deficient references, is simply not tenable. Withdrawal of the rejection of claim 88 is respectfully requested.

With respect to dependent claim 52 (currently amended), which was rejected for the same reasons as claim 88, the same reasons for why the rejection is not proper, as set forth immediately above for claim 88, apply. It is respectfully requested that the Examiner reconsider the rejection of claim 52, and withdraw that rejection as well.

The remaining claims which were rejected depend from one of the independent claims discussed above. These claims have further recitations, which in combination with the recitations of the claim from which they depend, are not taught or suggested in the art of record.

With specific reference to claims 116, 117 and 118, Ganz et al. does not disclose a mass spectrometer. As noted above, Ganz et al is directed to optical spectroscopy instruments. A careful reading of the description associated with the description of Fig. 1 of Ganz et al. will readily verify this fact. Thus it is submitted that claims 116, 117 and 118 are also directed to patentable subject matter.

With specific reference to claim 81, it is respectfully submitted that the Examiner is wrong about the teachings of Ganz et al. in that while Ganz et al. does teach the use of a test sample, it is used at a time separate and apart from when an actual sample is being evaluated, and not so as to acquire both calibration data and test data in one data acquisition, the latter not being acquired at all by Ganz et al.

With reference to claim 83, for the reasons set forth above, it is noted that there are no mass axes in Ganz et al., because Ganz et al. does not teach or suggest a mass spectrometer. As noted above, The Examiner has apparently recognized this in the first full paragraph of page 4 of the Office Action, wherein the Examiner states that Ganz et al. fail to disclose mass spectral peak shape function, specifying mass spectral target peak shape functions within respective mass spectral ranges

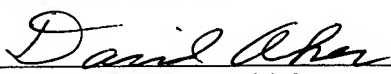
The same deficiencies of Ganz et al. apply with respect to claims 84 and 85. Further Ganz et al. do not, in the portion cited by the Examiner (column 8, lines 41 – 49), teach or suggest a regression analysis.

Conclusion

For all of the reasons set forth above, it is respectfully submitted that this application is in a condition for allowance. However, if there are any issues that remain that can be resolved by telephone, the Applicant and the undersigned respectfully request that the Examiner telephone the undersigned with a view toward working together to resolve those issues, and to allow this application to proceed to grant.

It is believed that no additional fee is due with this paper. However, if any additional fee is required, please charge deposit account no. 502244.

Respectfully submitted,


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